Radioactive Decay

1. A sample of radioactive nuclei is prepared so that its initial activity is $R_0 = 2.50 \times 10^3$ Ci. All of the nuclei in the sample have a half life of $T_{1/2} = 86.5$ hr. How many of the nuclei remain one year later?

2. A sample of $4.87 \times 10^{19}$ radioactive nuclei is prepared. All of the nuclei have the same half life. If the activity of the sample is 890 Bq exactly six weeks after its production, what is the half life of the nuclei?

3. The activity of a sample of radioactive nuclei that all have a half life of 8.65 yr is found to be 12.5 Ci. If the sample is known to be 900 yr old, what was the original number of radioactive nuclei in the sample?

4. Two different samples of radioactive nuclei having half lives $T_1$ and $T_2$ are produced at the same time. If the initial number of nuclei in the second sample is $n$ times greater than the initial number of nuclei in the first sample, how long will it take before both samples arrive at the same activity?

5. Two different samples of radioactive nuclei are produced at the same time. The half life of the first sample is $T$ and is exactly twice that of the second sample. The initial number of nuclei in the first sample is $N_0$ and is exactly three times greater than the initial number of nuclei in the second sample. How long after having been prepared will it take before the total activity of both samples combined is equal to $A$?